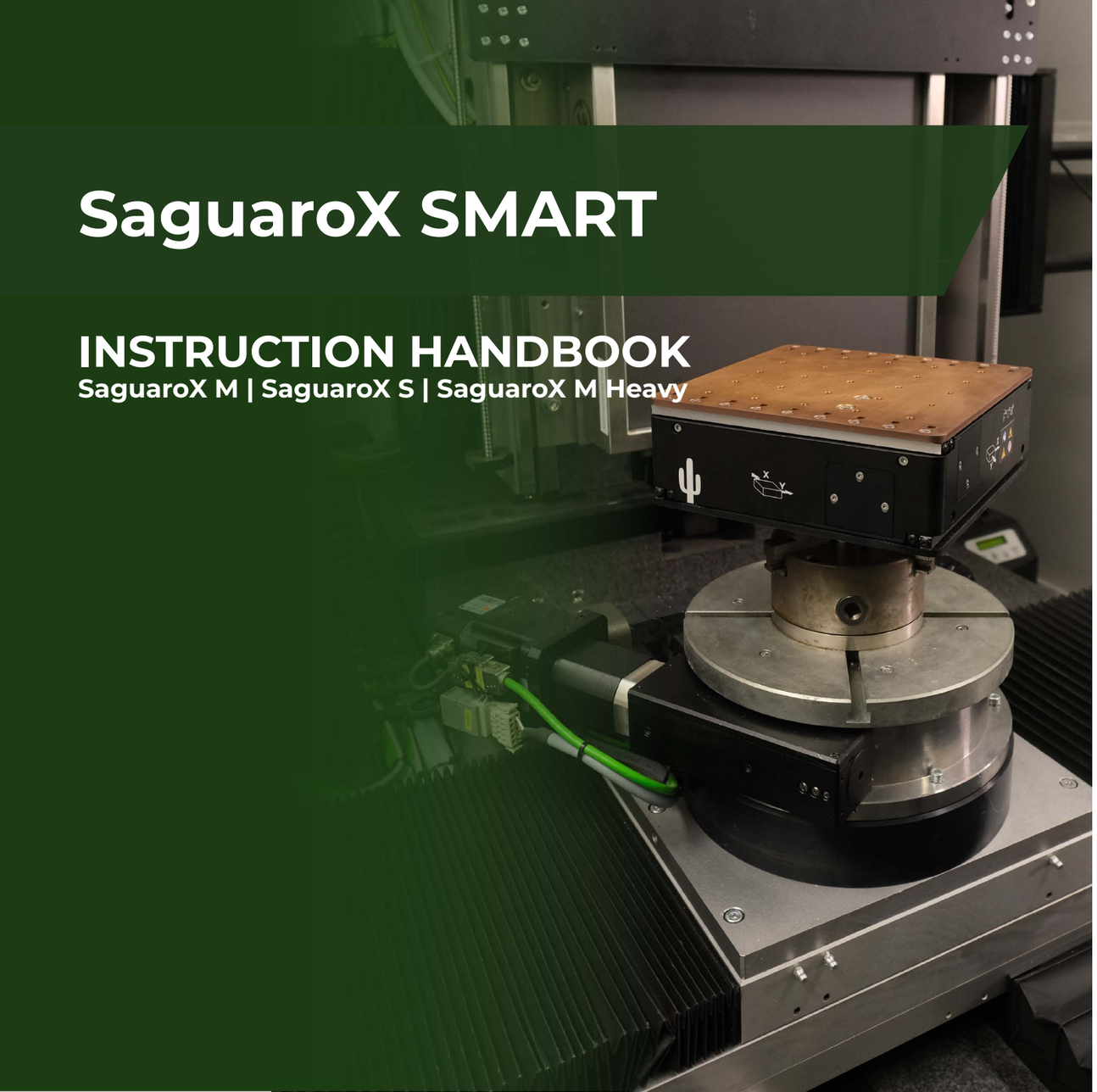
SaguaroX SMART

INSTRUCTION HANDBOOK

SaguaroX M | SaguaroX S | SaguaroX M Heavy



CACTUX

Instruction handbook for SaguaroX SMART | Version 1.1.e | Issue

Contents

IMPORTANT
READ BEFORE USE
SAVE FOR FUTURE REFERENCE

1. Introduction to this Instruction Handbook

The purpose of the instruction handbook is to provide the user with necessary information to use the product effectively and safely during its life cycle.

The instruction handbook consists of the technical data, data and instructions for the product's installation and transport. It also contains information concerning the operation and commissioning of the product.

The user of the product should read the entire instruction handbook. It contains important information on work safety, especially during the operation of this product, which largely depends on its proper use.

- If you do not understand some of the information in the instruction handbook, contact the product manufacturer.
- The instruction handbook can be found at www.cactux.cz/instruction-handbooks.

1.1. How to read and apply the Instruction Handbook

These instructions are marked in the operating instructions with the following safety alert symbols:

⚠WARNING CAUTION RISK OF HEALTH OR DAMAGE TO USER,
⚠CAUTION VERY IMPORTANT INFORMATION FOR THE USER,
NOTICE GENERAL IMPORTANT INFORMATION FOR THE USER.

Type of instruction handbook: user guide.

1.2. Safety Symbols

The main risks are addressed by the safety pictograms on the Device and the warnings in the operating instructions.

	Name: **Warning crushing of hands** (Ref. number: ISO 7010-W024) Description: There is a risk of deformation of the hands from mechanical parts of the Device.
	Name: **Not to be serviced by users** (Ref. number: ISO 7010-P069): Description: There is a risk of injury due to dangers that users do not recognize.
	Name: **Refer to instruction manual/booklet** (Ref. number: ISO 7010-M002) Description: The user is obliged to start work and / or operation of the Device only after reading the instructions for use.

Other important risks are addressed by the safety pictograms in this instructions handbook.

	Name: **Do not extinguish with water** (Ref. number: ISO 7010-P011) Description: To prohibit using water to extinguish a fire.
	Name: **No open flame; Fire, open ignition source and smoking prohibited**(Ref. number: ISO 7010-P003) Description: To prohibit smoking and all forms of open flame.
	Name: **Disconnect mains plug from electrical outlet** (Ref. number: ISO 7010-M006) Description: The mains plug must be disconnected from electrical outlet for the purposes of maintenance of el. equipment, in the case of malfunction or when left unattended.
	Name: **General warning sign** (Ref. number: ISO 7010-W001) Description: To signify a general warning

2. Declaration of Conformity SaguaroX

issued in accordance with the meaning of Article 5 (1) (a) (e) and Annex II, Part 1, Section A to Directive 2006/42/EC of the European Parliament and of the Council

Producer:	CactuX s.r.o.
Address:	Jundrovská 1230/19, Komín, 624 00 Brno
VAT ID (IČ):	09001468

hereby declares on his sole responsibility that the product:

Device identification:	SaguaroX
Type/mark:	S, M, M Heavy

is in conformity with the provisions of the following European Directives:

Directive 2015/863/EU	RoHS	ref. OJ L 137, 4.6.2015, p. 10-12
Directive 2014/30/EU	EMC	ref. OJ L 96, 29.3.2014, p. 79-106
Directive 2006/42/EU	MD	ref. OJ L 157, 9.6.2006, p. 24-86
Directive 2014/53/EU	RADIO	ref. OJ L 153, 22.5.2014, p. 62-106
Directive 2006/66/EC		ref. OJ L 266, 26.9.2006, p. 1 - 14

Harmonised standards and other technical specifications used in determining compliance:

• EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
• EN ISO 20607:2019	Safety of machinery - Instruction handbook - General drafting principles
• EN ISO 13854:2019	Safety of machinery - Minimum gaps to avoid crushing of parts of the human body
• EN ISO 14120:2015	Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards
• EN 894-2:1997+A1:2008	Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 2: Displays
• EN 60204-1:2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
• EN 62133-2:2017/A1:2021/AC:2022-01	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for portable sealed secondary lithium cis in confoells, and for batteries made from them, for use in portable applications - Part 2: Lithium systems
• EN IEC 61000-3-2:2019/A2:2024	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current < 16 A per phase)
• EN 61000-3-3:2013/A2:2021/AC:2022-01	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16 A per phase and not subject to conditional connection
• EN 61000-4-2:2009	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test
• EN IEC 61000-4-3:2020	Electromagnetic compatibility (EMC) - Part 4-3 : Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
• EN 61000-4-4:2012	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
• EN 61000-4-5:2014/A1:2017	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test
• EN IEC 61000-4-6:2023	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
• EN 61000-4-8:2010	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test
• EN IEC 61000-4-11:2020/AC:2022-10	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase
• EN 61010-1:2010/A1:2019/AC:2019-04	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements
• EN IEC 61010-2-201:2018	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-201: Particular requirements for control equipment
• EN IEC 62368-1:2024/A11:2024	Audio/video, information and communication technology equipment - Part 1: Safety requirements
• EN 62479:2010	Assessment of the compliance of low-power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)

• ETSI EN 301 489-17 V3.2.4 (2020-09)	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic compatibility
• ETSI EN 301 489-1 V2.2.3 (2019-11)	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic compatibility
• ETSI EN 300 328 V2.2.2 (2019-07)	Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band; Harmonised Standard for access to radio spectrum

The product meets basic safety requirements for electrical equipment according to the above documents.

This declaration becomes invalid if technical or operational modifications are introduced without the manufacturer´s consent.

Under normal conditions and conditions specified by the manufacturer, the product is safe.

In Brno
Date 13. 6. 2024

Ing. Jakub Šalplachta , PhD.
Executive manager

The product also complies with China ROHS Limits - SJ/T 11364-2006 Standard.

3. UK Declaration of Conformity SaguaroX

issued in accordance with EN ISO 17050-1:2010

Producer:	CactuX s.r.o.
Address:	Jundrovská 1230/19, Komín, 624 00 Brno
VAT ID (IČ):	09001468

hereby declares on his sole responsibility that the product:

Device identification:	SaguaroX
Type/mark:	S, M, M Heavy

is in conformity with the following UK Statutory Instruments (and their amendments):

Safety	Supply of Machinery Regulations 2008
	The Batteries and Accumulators Regulations 2008
EMC	Electromagnetic Compatibility Regulations 2016
Radio	Radio Equipment Regulations 2017
RoHS	The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012
Waste	The Waste Batteries and Accumulators Regulations 2009

Harmonised standards and other technical specifications used in determining compliance:

• EEN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
• EN ISO 20607:2019	Safety of machinery - Instruction handbook - General drafting principles
• EN ISO 13854:2019	Safety of machinery - Minimum gaps to avoid crushing of parts of the human body
• EN ISO 14120:2015	Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards
• EN 894-2:1997+A1:2008	Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 2: Displays
• EN 60204-1:2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
• EN 62133-2:2017/A1:2021/AC:2022-01	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for portable sealed secondary lithium cells, and for batteries made from them, for use in portable applications - Part 2: Lithium systems
• EN IEC 61000-3-2:2019/A2:2024	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current < 16 A per phase)
• EN 61000-3-3:2013/A2:2021/AC:2022-01	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16 A per phase and not subject to conditional connection
• EN 61000-4-2:2009	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test
• EN IEC 61000-4-3:2020	Electromagnetic compatibility (EMC) - Part 4-3 : Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
• EN 61000-4-4:2012	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
• EN 61000-4-5:2014/A1:2017	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test
• EN IEC 61000-4-6:2023	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
• EN 61000-4-8:2010	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test
• EN IEC 61000-4-11:2020/AC:2022-10	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase
• EN 61010-1:2010/A1:2019/AC:2019-04	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements
• EN IEC 61010-2-201:2018	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-201: Particular requirements for control equipment
• EN IEC 62368-1:2024/A11:2024	Audio/video, information and communication technology equipment - Part 1: Safety requirements
• EN 62479:2010	Assessment of the compliance of low-power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)

• ETSI EN 301 489-17 V3.2.4 (2020-09)	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic compatibility
• ETSI EN 301 489-1 V2.2.3 (2019-11)	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic compatibility
• ETSI EN 300 328 V2.2.2 (2019-07)	Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band; Harmonised Standard for access to radio spectrum

The product meets basic safety requirements for electrical equipment according to the above documents.

This declaration becomes invalid if technical or operational modifications are introduced without the manufacturer´s consent.

The technical documentation for the machinery is available from the manufacturer at the address above.

Under normal conditions and conditions specified by the manufacturer, the product is safe.

In Brno
Date 13. 6. 2024

Ing. Jakub Šalplachta, PhD.
Executive manager

4. Declaration of Conformity

According to 47 CFR, Part 15 of the FCC Rules

Producer:	CactuX s.r.o.
Address:	Jundrovská 1230/19, Komín, 624 00 Brno
VAT ID (IČ):	09001468

hereby declares on his sole responsibility that the product:

Device identification:	SaguaroX
Type/mark:	S, M, M Heavy

complies with part 15 of the FCC Rules.

It´s confirmed and found to comply with the requirements setup by ANSI C63.4 & FCC part 15 regulation for the evaluation of electromagnetic compatibility.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

In Brno
Date 13. 6. 2024

Ing. Jakub Šalplachta, PhD.
Executive manager

5. Device Overview SaguaroX M

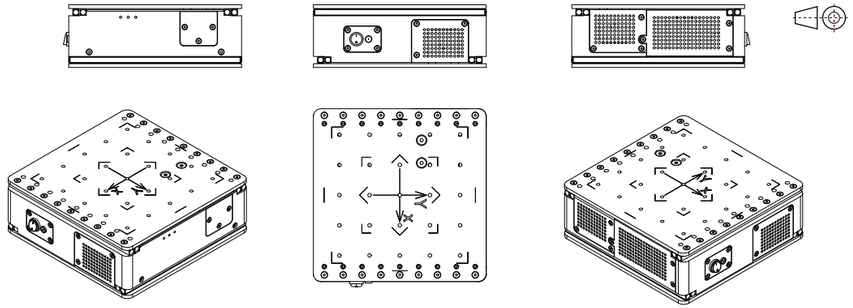
5.1. Intended Use

The Device is designed for sample mounting and sample centering with respect to the X-ray tube, primarily in industrial and laboratory X-ray Computer Tomography (CT) systems

5.2. Device Specification

x,y axes travel	100 mm × 100 mm
Sample area	220 mm × 220 mm
Sample area mounting possibilities	Rectangular pattern – Threads M6
Sample area plate	Magnetic stainless steel plate
Maximum load	15 kg
Weight	9 kg
Dimensions	229 mm × 229 mm × 82 mm (w/o adapters)
Device battery	Li-ion (14.4 V/6.8 Ah)
Runtime	Ca. 16 h continuous run
Input power	50 W
IP Code	IP20
Operation speed	5 mm per second (fast movement) / 0.5 mm per second (slow movement)
Characteristics of the power supply	24V/2.1 A with barrel connector (DC Jack) 5.5 x 2.1 mm
Wireless communication interface	Bluetooth Low Energy (BLE)
Resolution	10 µm

5.3. Graphical Description



6. Device Overview SaguaroX S

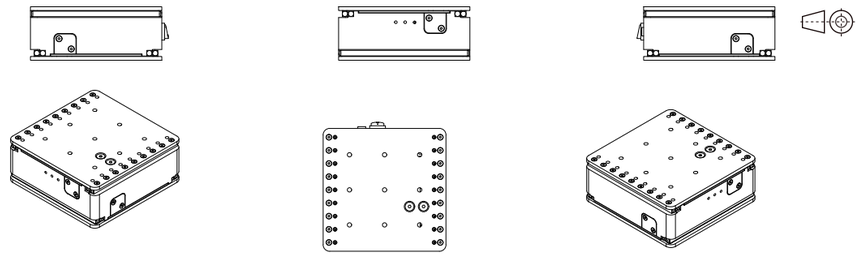
6.1. Intended Use

The Device is designed for sample mounting and sample centering in respect to the X-ray tube primarily in industrial and laboratory X-ray Computer Tomography (CT) systems

6.2. Device Specification

x,y axes travel	50 mm × 50 mm
Sample area	135 mm × 135 mm
Sample area mounting possibilities	Rectangular pattern –Threads M6
Sample area plate	Magnetic stainless steel plate
Maximum load	7 kg
Weight	2.6 kg
Dimensions	140 mm × 140 mm × 58 mm (w/o adapters)
Device battery	Li-ion (14.4 V/3.4 Ah)
Runtime	Ca. 8 h continuous run
Input power	50 W
IP Code	IP20
Operation speed	5 mm per second (fast movement) / 0.5 mm per second (slow movement)
Characteristics of the power supply	24V/2.1 A with barrel connector (DC Jack) 5.5 x 2.1 mm
Wireless communication interface	Bluetooth Low Energy (BLE)
Resolution	10 µm

6.3. Graphical Descriptions



7. Device Overview SaguaroX M Heavy

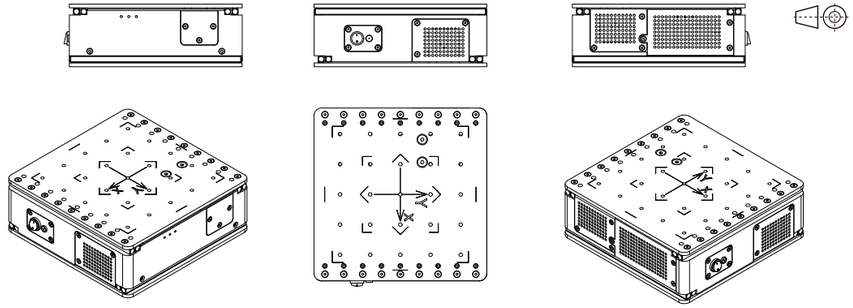
7.1. Intended Use

The Device is designed for sample mounting and sample centering in respect to the X-ray tube primarily in industrial and laboratory X-ray Computer Tomography (CT) systems

7.2. Device Specification

x,y axes travel	100 mm × 100 mm
Sample area	220 mm × 220 mm
Sample area mounting possibilities	Rectangular pattern – Threads M6
Sample area plate	Magnetic stainless steel plate
Maximum load	30 kg
Weight	13.5 kg
Dimensions	229 mm × 229 mm × 82 mm (w/o adapters)
Device battery	Li-ion (14.4 V/6.8 Ah)
Runtime	Ca. 16 h continuous run
Input power	50 W
IP Code	IP20
Operation speed	5 mm per second (fast movement) / 0.5 mm per second (slow movement)
Characteristics of the power supply	24V/2.1 A with barrel connector (DC Jack) 5.5 x 2.1 mm
Wireless communication interface	Bluetooth Low Energy (BLE)
Resolution	10 µm

7.3. Graphical Descriptions



8. Package Content SaguaroX M

The Device and its equipment is delivered in packaging designed for a safe transport. Optional accessories are delivered in a separate package

8.1. Contents of the Standard Package

Art. no.	Component	Pieces
A0017	SaguaroX M	1 pc.
A0006	Desktop Stand	1 pc.
A0008	Adapter D20	1 pc.
A0009	Adapter D50	1 pc.
A0010	Adapter D150	1 pc.
A0005	Mandrel	1 pc.
S0046	Adapter D20 (Top)	1 pc.
S0278	Transmitter USB Dongle	1 pc.
B0010	Wafer D330	1 pc.
B0049	USB Extension Cable	1 pc.
B0022	Flash Drive	1 pc.
B0023	Power Adapter	1 pc.
B0034	Imbus Key (90 mm)	1 pc.
B0033	Bolt M6×8 ISO 10642	4 pcs.
B0019	Bolt M6×14 AN 9084	4 pcs.
B0019-A	Bolt M6×14 ISO 10642	4 pcs.
B0047	Instruction Handbook	1 pc.
Z0001	Arizona Software	1 pc.
B0050	Plastic Case	1 pc.

8.2. Optional Accessories

Art. no.	Component	Pieces
-	Magnetic Adapters	-
XS0034	Rod Holder (1 - 10 mm)	1 pc.
-	CT-Igel Hedgehogs	-

9. Package Content SaguaroX S

The Device and its equipment is delivered in packaging designed for a safe transport. Optional accessories are delivered in a separate package

9.1. Contents of the Standard Package

Art. no.	Component	Pieces
XS0119	SaguaroX S	1 pc.
A0006	Desktop Stand	1 pc.
A0008	Adapter D20	1 pc.
A0009	Adapter D50	1 pc.
XS0034	Rod Holder (1 - 10 mm)	1 pc
A0005	Mandrel	1 pc.
S0046	Adapter D20 (Top)	1 pc.
S0278	Transmitter USB Dongle	1 pc.
B0049	USB Extension Cable	1 pc.
B0022	Flash Drive	1 pc.
B0023	Power Adapter	1 pc.
B0034	Imbus Key (90 mm)	1 pc.
B0019	Bolt M6×14 AN 9084	4 pcs.
XS0048	Bolt M6×12 ISO 10642	4 pcs.
B0047	Instruction Handbook	1 pc.
Z0001	Arizona Software	1 pc.
B0050	Plastic Case	1 pc.

9.2. Optional Accessories

Art. no.	Component	Pieces
-	Magnetic Adapters	-
XS0034	Rod Holder (1 - 10 mm)	1 pc.
-	CT-Igel Hedgehogs	-

10. Package Content SaguaroX M Heavy

The Device and its equipment is delivered in packaging designed for a safe transport. Optional accessories are delivered in a separate package

10.1. Contents of the Standard Package

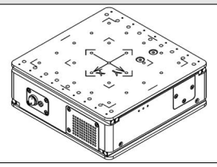
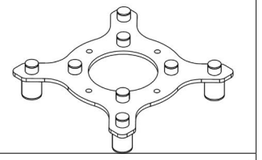
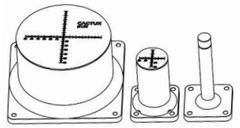
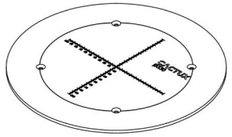
Art. no.	Component	Pieces
XH0007	SaguaroX M Heavy	1 pc.
A0006	Desktop Stand	1 pc.
A0008	Adapter D20	1 pc.
A0009	Adapter D50	1 pc.
A0010	Adapter D150	1 pc.
A0005	Mandrel	1 pc.
S0046	Adapter D20 (Top)	1 pc.
S0278	Transmitter USB Dongle	1 pc.
B0010	Wafer D330	1 pc.
B0049	USB Extension Cable	1 pc.
B0022	Flash Drive	1 pc.
B0023	Power Adapter	1 pc.
B0034	Imbus Key (90 mm)	1 pc.
B0033	Bolt M6×8 ISO 10642	4 pcs.
B0019	Bolt M6×14 AN 9084	4 pcs.
B0019-A	Bolt M6×14 ISO 10642	4 pcs.
B0047	Instruction Handbook	1 pc.
Z0001	Arizona Software	1 pc.
B0050	Plastic Case	1 pc.

10.2. Optional Accessories

Art. no.	Component	Pieces
-	Magnetic Adapters	-
XS0034	Rod Holder (1 - 10 mm)	1 pc.
-	CT-Igel Hedgehogs	-

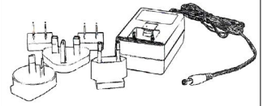
10.3. Device, its equipment, and Optional Accessories Description

Note: The figures in this chapter are not in scale and are placed here for demonstration purposes only

Component	Description	Picture
SaguaroX	- is used for centering the sample in respect to the X-ray tube. - variants are SaguaroX M, SaguaroX S, SaguaroX M Heavy.	
Desktop Stand	- is used to hold the Device, for example during charging of batteries.	
Adapters	- are used for placement of the sample closer to the X-ray tube, - three steel-plate equipped Adapters are delivered with different upper diameters (D 150 mm, D 50 mm and D 20 mm). - adapter D20 is delivered with 1 additional plastic top.	
Mandrel	- is mounted to the Device with Bolt M6x14 ISO 10642, - is used to attach the Device to the chuck inside of the CT shielding cabinet of a CT System.	
Transmitter USB Dongle	- is connected to the acquisition computer via the appropriate USB port available inside the shielding cabinet of the CT System or via the provided USB Extension Cable, - provides the communication between Arizona Software and the Device.	
Wafer D330	- is used for the placement of samples when needed according to their proportions, - it is used for samples with a weight between 10 – 15 kg (SaguaroX M) or 10 – 30 kg (SaguaroX M Heavy), samples are placed on a marked circle, - should be attached to the Device with Bolts M6×8 ISO 10642.	

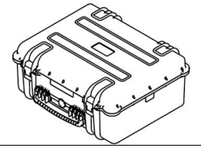
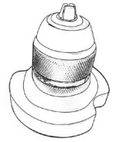
Component	Description	Picture
USB Extension Cable	- is used to connect the acquisition computer and Transmitter USB Dongle.	

Flash Drive	- consists of:
	  - Instruction Handbook for SaguaroX (this Instruction Handbook),
	  - Driver folder,
	  - Arizona folder.
		

Power Adapter	- is used for charging the Device.	
Imbus Key (90 mm)	- is used to install the Bolts.	

Bolts	- are used to attach:
	  - mandrel to the Device with Bolt M6×14 ISO 10642 (SaguaroX M, SaguaroX M Heavy) or Bolt M6×12 ISO 10642 (SaguaroX S)
	  - wafer D330 to the Device with Bolt M6×8 ISO 10642,
	  - adapter when a firm connection with the Device with Bolt M6×14 AN 9084 is required.
		 Bolt M6×8 ISO 10642
		  Bolt M6×14 AN 9084
		  Bolt M6×14 ISO 10642
		Bolt M6×12 ISO 10642

Arizona Software	- is used to control the Device.	

Component	Description	Picture
Plastic Case	- is used for transportation and storage of the Device and other content of the package.	
Rod Holder (1 - 10 mm)	- is used to hold cylindrical samples. - it is compatible for cylindrical samples with diameters from 1 to 10 mm.	
CT-Igel Hedgehogs (optional accessory)	- allows positioning of components in a simple, flexible, fast way, without adhesive materials. - the underside equipped with magnets allows easy positioning on magnetic disks. - is suitable for most foamed materials, such as B. Styrofoam, Styrodur.	

11. Safety

11.1. General Warning

⚠WARNING Follow safety instruction to avoid risk of injury to yourself or others!
⚠CAUTION Do not modify product. Any consequences will not be covered by support service or Device warranties!
⚠CAUTION Arbitrary changes to Device without manufacturer's permission release manufacturer from liability from consequential damage or injury!
NOTICE Device might not conform to European Directives if any part of product is replaced with part not supplied by manufacturer.

11.2. Requirements for Operator

⚠WARNING Do not work on Device under influence of alcohol, drugs or medication.
⚠CAUTION Do not operate Device unless you have read all instructions supplied by manufacturer and understand procedure.
⚠CAUTION Do not exceed limitations specified in instruction handbook.
NOTICE The Device may only be operated by a person:
- who is professionally qualified to work with the CT System in which the Device is installed,
- who is well acquainted with the Device's characteristics and is familiar with the relevant regulations for its operation,
- who follows currently valid regulations concerning occupational safety and accident prevention.

11.3. Safety Instructions

Environmental Conditions

Limits for intended operating environmental conditions	
Location	Indoor use only
Maximum altitude	2,000 m
Temperature range	5 °C to 40 °C
Maximum humidity	80% RH at 31°C

⚠WARNING Do not exceed any limitation of environmental conditions.
⚠WARNING Operations outside environmental limits may adversely affect operator safety. For example, if Device is exposed to extreme temperatures, battery fire or explosion may result.
⚠WARNING Use of Device outside above conditions releases manufacturer from liability for consequential damage or injury!
⚠CAUTION Device must not be rinsed with water.
⚠CAUTION Protect Device from moisture, direct sunlight and dusty environment.

11.4. Hazards

Mechanical Hazards

WARNING Risk of injury and deformation of hand or other parts of body due to movement of Device. Take extra care when handling to avoid injuring yourself or others.
WARNING Improper positioning of Device may damage Device due to fall.
WARNING Improper handling of Device can result in injury of person or damage to Device.
WARNING Do not expose the Device to mechanical shocks.

Electromagnetic Hazards

WARNING Use of Device can negatively influence electrically controlled medical Devices, such as ICDs and Pacemakers.
NOTICE All equipment must be checked within the signal area of Transmitter USB Dongle before first switching on Device. All equipment which could possibly use same range of frequency must be switched off.

Thermal Hazards

In connection with the above-mentioned warning and in accordance with the provisions of the relevant law, the user is obliged to prevent fire.

WARNING Do not store flammable liquids or other hazardous substances and gases near Device.
WARNING No open fire should be used near Device, do not smoke when operating Device.
CAUTION In case of fire, follow fire instructions according to the workplace.
NOTICE Manufacturer does not equip Device with fire-fighting equipment. User is obliged to secure building where Device is installed:
- Suitable extinguishing media of approved type, in appropriate quantities, placed at visible place and protected against damage and misuse.
- Fire extinguishers are subject to regular inspections and operator must be demonstrably acquainted with their use, as required by applicable law and decree.

Electrical Hazards and Battery Hazards

WARNING Electrical equipment must not be extinguished with water!
CAUTION Risk of overheating, damage, or explosion of a damaged battery when using Device improperly. Reduce risk of unauthorized manipulation of Device by user.
WARNING Damage to battery may cause fire, which may cause injury.
NOTICE Recommended: powder, snow or halonous fire extinguisher Devices. Operator must be introduced to use them.

12. Disposal

Expected lifetime of the Device is at least 3 years.
Note: Expected lifetime does not apply to the Lion batteries and the provided equipment and optional accessories.
All equipment and optional accessories have a lifespan of at least 1 year. For more information, visit our website or contact us at support@cactux.cz.

CAUTION Device is no longer viable if it does not move and / or cannot be charged or / and if operating time is disproportionately shortened.
CAUTION Do not dispose any equipment included in package with general household waste. Observe and comply with national and federal laws and regulations that are equivalent to EC directives. Contact support@cactux.cz about disposal, once Device reaches end of its lifetime.

13. Transportation, Handling and Storage

13.1. Transportation and Storage

NOTICE Use original packaging for transporting Device, its equipment and accessories.
NOTICE Store product in original packaging provided.
NOTICE Store package in horizontal position.
NOTICE If Device is to be shut down for more than two months, it must be:
- stored in place corresponding to limits for intended operating environmental conditions,
- disconnected from electricity,
- stored in original packaging,
- we recommend to fully charge Device before storage.

NOTICE Shutting down Device for more than 6 months must be consulted with manufacturer.
NOTICE If cell is kept for a long time (3 months or more), it is strongly recommended that battery cell is preserved at dry and low-temperature.

13.2. Handling

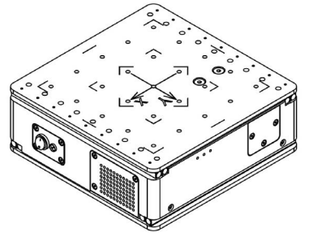
CAUTION Avoid damaging CT Device during handling of Device.
NOTICE During handling of Device inside of CT System, it must be placed at least 15 cm away from the wall of the cabinet and from X-ray tube and detector of CT System.

The Device must be handled safely to prevent harmful impacts.

During handling, the Device:
- must be unplugged from the power source,
- must be turned off.

The Device must be handled:
- according to its weight,
- by a physically fit person who can carry at least 15 kg in both hands for at least 1 minute.

The placing of the Device:
- only with the stainless steel plate with engraved *x,y* coordinate system up.



14. Installation and Commissioning

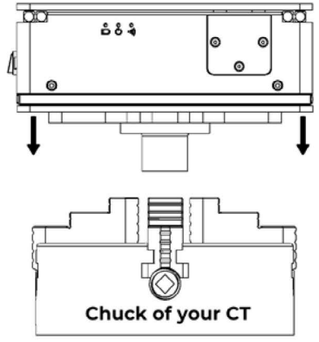
NOTICE After unpacking Device, keep original packaging for later storage or transport.

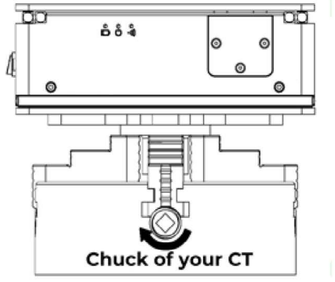
After unpacking from the protective packaging the Device is ready to be used.

14.1. Installation of the Device to the CT System

If the rotation stage of your CT system is equipped with a chuck, then follow steps 1 and 2. In other cases please contact support@cactux.cz for further instructions if needed.

1. Insert the Device with the attached Mandrel into the CT machine chuck (Mandrel should face down, in the direction of the CT's chuck).
2. Fasten the chuck of your CT.
3. For the installation of the Device, a free USB port inside the shielding cabinet and within the range of the Device is needed.
4. This port is connected to the computer where the Device control software (Arizona) will be installed. Preferably, this computer should be the acquisition computer of the CT Device.
5. If no USB port inside the shielding cabinet is available, or the available USB ports are not in the sight of the Device, the attached USB extension cable should be used.
6. Place the Transmitter USB Dongle inside the shielding cabinet of the CT machine to the USB port within the range of the Device. Recommended distance between dongle and SaguaroX is up to 2 metres. To reach optimal functionality of the wireless communication, place the dongle at the same height as a Device without any solid barrier.





14.2. Software Installation

- The software and configuration files are located on the provided Flash Drive
- The latest version of the software can also be found on the webpage www.cactux.cz/arizona-software

Key Features

- **Bluethoot Connectivity:** Bluetooth technology is used for wireless connection with the Device
- **Precise Movement Control:** Intuitive control interface of Arizona app allows precise and accurate control of the Device
- **Real-Time Feedback:** The Device receives instant feedback on exact position and status
- **Customizable Settings:** All settings can be controlled

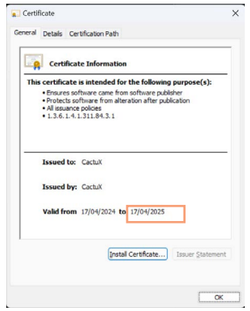
Minimum Requirements

Requirements	Minimum
Targeted Platform	Windows 10
Windows Minimum Version	10.0.17763.0
RAM	At least 2 GB of RAM is recommended for basic functionality
CPU	A standard processor, for example Intel Pentium or AMD Athion

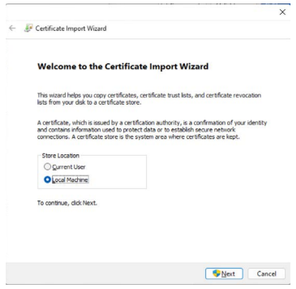
Installation

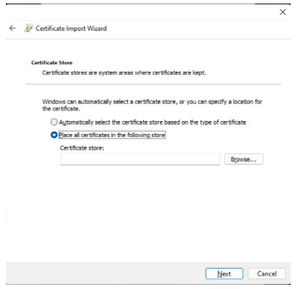
1. Copy the content of Flash Drive to a folder in your PC
2. Navigate to the Installer and Security Certificate for Arizona Application
3. Install as **“Administrator”**
4. Proceed with **Certificate Installation**

- Open **Security Certificate** file **“Arizona_Certificate_<version>”**
- Click on **“Install Certificate”** in opened window
- Choose **“Store Location”** as **“Local Machine”**
- Click on **“Next”**
- Choose **“Place all certificates in the following store”**
- Click on **“Browse”**
- Select **“Trusted Root Certification Authorities”**
- Click on **“OK”**
- Click on **“Next”**
- Click on **“Finish”** to install the certificate



Certificate Installation

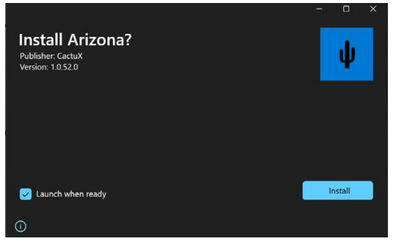




Certificate Installation

5. Proceed with **Software Installation**
6. Open Installer file **“Arizona_Installer_<version>”**
7. Optionally choose **“Launch when ready”**
8. Click on **“Install”**
9. After installation, you can find the application in **Windows Search** by typing “**Arizona**”
10. For better accessibility, **pin “Arizona”** to the Windows Taskbar

- *If required, enable* “Developer mode” *in Windows Settings, then repeat the installation*
- *After installing, optionally turn* “Developer mode” *off*



Software Installation

Software Installation for Windows LTSC

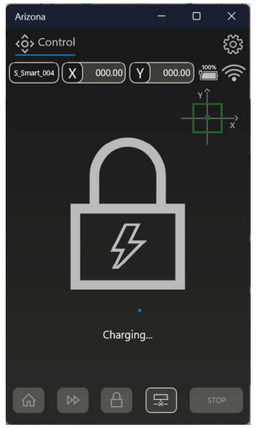
- Right-click on **“run_installer_powershell”** and select **“Run with PowerShell”**
- *If required, enable* “Developer mode” *in Windows Settings, then repeat the installation*

Indicators

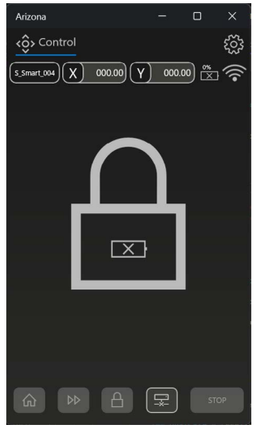
- **Device Name:** Name of the connected device (1)
- **Current Position:** The current position of the device is described in the X (2) and Y (3) axes in millimetres
- **Battery Level:** Battery Level in percentage (4) with the corresponding icon for Movement Mode, Power Save Mode, Charging Mode and Battery Critically Low Mode
- **Bluetooth Signal Strength:** Icon signalizing Bluethoot connection signal strength (5)

Arizona Interface

Power Save Mode



Charging Mode



Battery Critical Low Mode

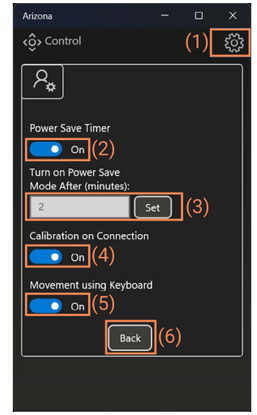
Application Settings

Click the “Application settings” button (1)

Power Save Mode Settings:

- Turn on or off the Power Save Timer mode (2)
- If on, type in minutes into the text box (3), the Power Save Mode is triggered, the application is locked
- Click the “Set” button

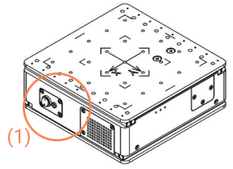
Calibration Settings: Turn on or off Calibration on Connection to the Device (4)
Keyboard Motion Control Settings: Turn on or off the Keyboard Control of the movement (5)
Back: Click the “Back” button (6) to go back to the Movement Control Menu



Application settings

14.3. Commissioning

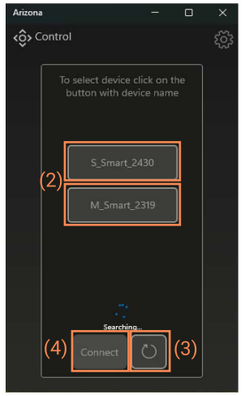
Commissioning of the Device



1. After the Device has been installed inside the CT shielding cabinet, it is ready to be used
2. Turn the Device on by pushing a Switch (1) until it lights up (approximately 3-4 seconds)
3. Device should start flashing intermittently the blue and the red diode in the Switch. It indicates that the Device is on and not connected to the control software*
4. Pair the Device with the acquisition computer

For Windows 10:
- Select **Start > Settings > Bluetooth & devices**
- Choose **Add Bluetooth or Other Device**:
  Find and select the Device from the list of available devices
  Once the Device is selected, click **Done** to complete the pairing process
- After this process is complete, the Device will be listed under **Other Devices** in:
  Start > Settings > Bluetooth & devices

For Windows 11:
- Select **Start > Settings > Bluetooth & devices > Devices**
  In Device settings, select **Advanced** for **Bluetooth device discovery**
- Select **Start >** select **Settings > Bluetooth & devices > Devices**
- Choose **Add Device**:
  Find and select the Device from the list of available devices
  Once the Device is selected, click **Done** to complete the pairing process
- After this process is complete, the Device will be listed under **Other Devices** in:
  Start > Settings > Bluetooth & devices > Devices



Connection Menu

5. Open Arizona software on the acquisition computer
6. Connect to the device – Connection Menu
- **Automatic Search:** After start, the Application automatically searches for available Devices via Bluetooth

- **Device Display:** Detected Devices are displayed as toggle buttons (2), labelled with the Device's ID
- **Restart Search:** To restart the Search for devices, click the "Reset" button (3)
- **Select Device:** Click the toggle button of the Device's ID (2)
- **Connect:** Click the "Connect" button (4) to start the Bluetooth connection

7. The Device is connected when the Switch's green and blue diodes start flashing intermittently**
8. The Device is now ready to be used

Troubleshooting Commisioning

* If the red diode flashes intermittently it indicates a low battery. Charge the Device (See chapter 15.6)
** If the connection is not established, change the dongle position

⚠CAUTION Do not operate Device when charging. While charger is plugged in, movement of Device is disabled

15. Operation

15.1. Operation Environment

In the shielding cabinet of the CT machine

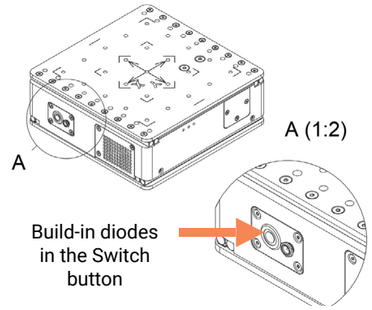
⚠WARNING Only operate Device when shielding cabinet door is closed in order to prevent injuries to yourself and others.

15.2. Operation Modes – Colour Indication

The Switch button, located on the side of the Device, indicates the Device's status in colours (red, green, blue)

Colour Coding

Status	Colour Coding
Device is ON & Not Connected	Intermittently flashing of green and red diode
Device is ON & Connected	Intermittently flashing of green and blue diode
Low Battery	Intermittently flashing of red diode
Charging	Lighting of red diode
Charging Completed	Lighting of green diode



15.3. Operation Instruction

The operator controls the Device from outside the shielding cabinet using Arizona Software

⚠WARNING Do not use this Device or stop using Device immediately when:
- it is emitting smoke,
- it is unusually hot to touch,
- it is emitting unusual odor,
- it is emitting unusual noise,
- it is in any other abnormal state or wear or damage,
- it is no longer safe to use, for example due to aging.

If any problem appears, switch off power and if connected, then disconnect electronics power supply.
Contact support@cactux.cz and request repairs.

Calibration

When the Application connects to the Device and Calibration is allowed in settings, the calibration window appears

To start calibration

1. **Start Homing** (1): Procedure to move the Device into Home position (x = 0, y = 0)
   Reset Position (2): Procedure to set the Device position to the previous coordinates
   Skip (3): Skip Calibration

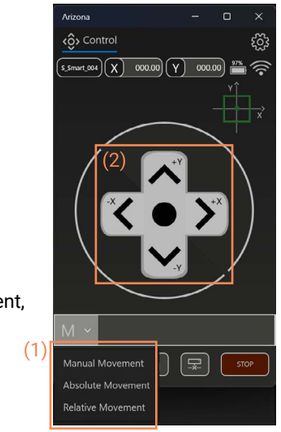
Calibration Menu

Device Motion Control

Movement Mode Menu: Click the dropdown button (1) and select one of the following modes:

Manual (M): Direct control over device movement

1. Select the “Manual Movement” (1) and use one of the options for manual movement:
2. **Keyboard:** To start the movement press the key. To stop the movement release the key
- (X+) Arrow Right
- (X-) Arrow Left
- (Y+) Arrow Up
- (Y-) Arrow Down
3. **Screen buttons on Arizona Software (2):** Click the screen button to start the movement, release the screen button to stop the movement



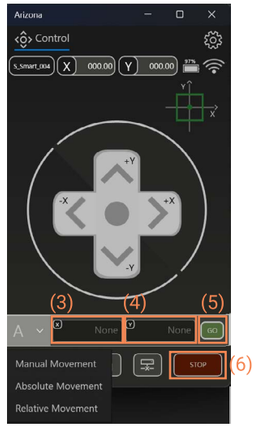
Device Motion Control (M)

Absolute (A): Move to specific X and Y coordinates

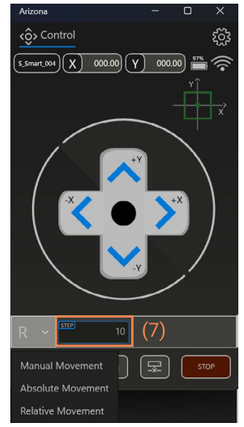
1. Select the “Absolute Movement” (1)
2. Type coordinates for X (3) and Y (4) axes
3. Click “GO“ button (5) to start

Relative (R): Move by incremental steps

1. Select the “Relative Movement” (1)
2. Type the size of one step in millimetres (7)
3. Use one of the options for movement:
4. **Keyboard:** To start the movement in incremental steps press the key
- (X+) Arrow Right
- (X-) Arrow Left
- (Y+) Arrow Up
- (Y-) Arrow Down
5. **Screen buttons on Arizona Software (2):** Click the screen button to start the movement in incremental steps. Release the screen button to stop the movement in incremental step



Device Motion Control (A)



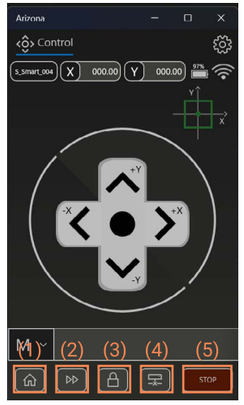
Device Motion Control (R)

Bottom Panel Buttons

Homing: Point (x = 0, y = 0) is the Home position (Reference position). The top and bottom plates are aligned

To start Homing:
1. Click the “Homing” button (1)
2. Click the “Start” button in appeared dialog window
3. Optionally stop with the “Stop” button

Speed Change: Click the “Speed” button (2) to select fast or slow speed
Power Safe Lock: Click the “Lock” button (3) to start or stop the Power Save Mode
Disconnect from Device: Click the “Disconnect” button (4) to disconnect from the connected Device
Stop Device Movement: Click the “Stop” button (5) to stop the Device’s movement



Bottom Panel Buttons

15.4. Sample Placement

- The samples can be placed directly on the stainless steel plate (with the engraved *x,y* coordinate system)
- Adapters help to place the sample in a better position relative to the X-ray tube
- Always pay attention to the weight of the sample and, if the sample is rather heavy, use the appropriate equipment

WARNING Please note that sample will rotate during CT measurement.
WARNING Always place sample so that 360 degree rotation is enabled.
CAUTION Manufacturer is not responsible for any damage to Device or CT associated with improper sample handling.
NOTICE Please use appropriate Adapter for your sample. We recommend not to exceed upper part of Adapter by sample.

Specification for SaguaroX M

Sample with weight < 10 kg
- Samples lighter than 10 kg can be placed directly on the stainless steel plate (with the engraved *x,y* coordinate system)
- The samples can be placed onto the provided Adapters

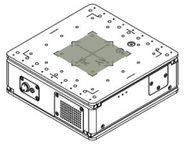
Sample with weight between 10 - 15 kg
- The maximum weight of the load on the Device is 15 kg
- Place the centre of gravity of the sample in the highlighted area of the sample area plate – engraved corners on the top plate
- Or use the circular steel plate (Wafer D330). Attach it to the Device with four bolts (M6x8 ISO 10642). Place the sample within the marked circle on the Wafer D330

Sample with weight > 15 kg
WARNING Do not measure samples heavier than 15 kg using SaguaroX M.

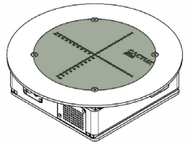
Specification for SaguaroX S

Sample with weight < 7 kg
- Samples lighter than 7 kg can be placed directly on the stainless steel plate (with the engraved *x,y* coordinate system).
- The samples can be placed onto the provided Adapters.

Sample with weight > 7 kg
WARNING Do not measure samples heavier than 7 kg using SaguaroX S.



Area to place the centre of gravity of the sample



Area to place samples on Wafer 10 – 15 kg (SaguaroX M) / 10 – 30 kg (SaguaroX M Heavy)

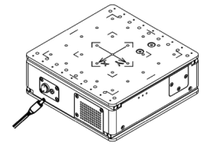
Specification for SaguaroX M Heavy

Sample with weight < 10 kg
- Samples lighter than 10 kg can be placed directly on the stainless steel plate (with the engraved *x,y* coordinate system).
- The samples can be placed onto the provided Adapters.

Sample with weight between 10 - 30 kg
- The maximum weight of the load on the Device is 30 kg.
- Place the centre of gravity of the sample in the highlighted area of the sample area plate – engraved corners on the top plate
- Or use the circular steel plate (Wafer D330). Attach it to the Device with four bolts (M6x8 ISO 10642). Place the sample within the marked circle on the Wafer D330

Sample with weight > 30 kg
WARNING Do not measure samples heavier than 30 kg using SaguaroX M Heavy.

15.5. Charging of the Device



1. Plug the charging connector of the Power Adapter into the power supply connector of the Device
2. Unplug the charging connector when the battery is fully charged
3. Proceed to use the Device as specified in the instruction handbook

CAUTION Only use supplied Power Adapter for charging.
CAUTION Do not operate Device when charging. While Power Adapter is plugged in, movement of Device is disabled.
CAUTION Inverse charging should be strictly prohibited. If cell is connected improperly, it may be damaged.
NOTICE In case of daily use, it is recommended to charge Device every night.
NOTICE Continuous charging under appropriate voltage does not cause any loss of characteristics. However, charge timer is recommended to be installed for safety consideration, which shuts off further charging at time specified in product specification.
NOTICE Over-discharging may occur by self-discharge if battery is left for a very long time without any use.
NOTICE Cell should be used within a short period after charging because long-term storage may cause loss of capacity by self-discharging.
NOTICE If long-term storage is necessary, cell should be stored at lower voltage within a range specified in product specifica-

Charging Method	Constant Current (CC) up to 16.5 V (speed charging) Constant Voltage (CV) 16.5 V – 16.6 V (constant voltage with limited current)
Charging Time – Standard charge	Ca. 4.5 hours
Operating Temperature (Cell Surface Temperature)	Charge: 0 to 45°C Discharge: -20 to 60°C
Max. Voltage of the battery cell	16.7 V
Max. Voltage of the battery cell	12.5V
Low battery indication value	<13V

NOTICE Operator is obliged to check Device, Equipment and accessories before starting work for signs of damage or other properties that could lead to threat to health or property.
NOTICE Switch off Device and disconnect Power Adapter form Device before maintenance.
NOTICE Package includes Power Adapter with interchangeable adapters (USA, EU, UK and AUS).

16. Inspection, Testing and Maintenance

16.1. Cleaning of the Device

Keep the Device clean and dry.
Wipe off dirt with a dry, lint-free cloth only.

NOTICE Cleaning of Device is only performed when Power Adapter is disconnected from Device. Switch off Device during cleaning.
⚠CAUTION Do not use flammable liquids or abrasives to clean Device.
⚠CAUTION Do not clean with pressurized water.
NOTICE Labels with instructions for operation, maintenance and identification must be kept legible.

16.2. Troubleshooting and Repair

NOTICE Device stops moving when
- there is too much load on Device,
- obstacle prevents Device from moving,
- battery status is too low (indicator),
- movement is blocked by software (button in software),
- Device loses communication with Transmitter USB Dongle,
- Other reasons occur.

Solution: remove obstacles, charge battery, unlock Device, or proceed to next info.

NOTICE If Device does not move
- First check speed. In slow mode, movement may not be noticeable. Switch to fast mode and check speed of movement. If it does not help and Device still does not move, move on to next step.
- Check battery status, if battery is low, charge Device. If it does not help and Device still does not move, move on to next step.
- Check communication status:
- if Switch button on the Device is not flashing blue and green,
- and / or symbol in Arizona is stop sign of wifi symbol.

If one of situations occurs, move Transmitter USB Dongle to better position in range of Device.
- if the Switch button on the Device is flashing blue and green, and at same time there is no stop sign on the wifi symbol, but the Device is still not moving, restart the Device (switch off / on) and perform the above steps again.
- if the Device does not respond and the Switch button is red, press and hold the button for 10s for hard reset
- if Device still does not move, contact support@cactux.cz.

NOTICE If liquid has entered Device then:
- Switch off Device,
- Disconnect power supply cable,
- Contact support@cactux.cz and request repairs.

NOTICE If Device has been stored at low temperature or in environment of high humidity, it must be allowed to reach ambient conditions before being powered up.

17. List of used Abbreviations

BLE	Bluetooth Low Energy
CT	X-ray Computed Tomography
IP Code	Ingress Protection Code

18. Glossary

Manufacturer	A company CactuX
Product	All contents of the package including optional accessories
Device	SaguaroX
Operator	An user qualified to operate the Device

19. About CactuX s.r.o.

CactuX is a technology company that aims to transform X-ray inspection technologies into modern, adaptive, high-performance and affordable analytical tools. Our strategy is to combine research expertise with industrial applications to innovate in the non-destructive testing (NDT) market. Our core products are SMART tools and expertise delivery that streamline NDT analysis, promoting automation, speed and accuracy. We have in-house HW and SW development as well as small-batch production. To date, the product portfolio includes a range of solutions including wireless motorised manipulators for easy sample handling, calibration phantoms and the innovative In-situ BOX system facilitating simulation of real conditions during CT analysis.

20. Contact

support@cactux.cz
www.cactux.cz

CactuX s.r.o.
Jundrovská 1230/19, Komín, 624 00 Brno
CRN (IČO): 09001468
VATIN (DIČ) CZ09001468

CE Marking Compliance

EN IEC/IEEE 85079-1 Compliance

ISO 3864 and ANSI Z535.6 Compliance

Machinery Directive and EN ISO 20607 Compliance

Contact

support@cactux.cz
www.cactux.cz

CactuX s.r.o.
Jundrovská 1230/19, Komín, 624 00 Brno
CRN (IČO): 09001468
VATIN (DIČ): CZ09001468

Instruction handbook for SaguaroX SMART
Issue date 2024
Version 1.0.e